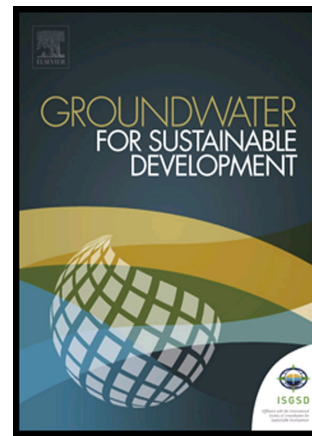


Author's Accepted Manuscript

Exploring Suitable Sites for Installing Safe Drinking Water Wells in Coastal Bangladesh

Ratnajit Saha, Nepal C. Dey, Sajidur Rahman, Lakshman Galagedara, Prosun Bhattacharya



www.elsevier.com/locate/gsd

PII: S2352-801X(17)30109-1
DOI: <https://doi.org/10.1016/j.gsd.2018.03.002>
Reference: GSD113

To appear in: *Groundwater for Sustainable Development*

Received date: 26 July 2017
Revised date: 8 December 2017
Accepted date: 5 March 2018

Cite this article as: Ratnajit Saha, Nepal C. Dey, Sajidur Rahman, Lakshman Galagedara and Prosun Bhattacharya, Exploring Suitable Sites for Installing Safe Drinking Water Wells in Coastal Bangladesh, *Groundwater for Sustainable Development*, <https://doi.org/10.1016/j.gsd.2018.03.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Exploring Suitable Sites for Installing Safe Drinking Water Wells in Coastal Bangladesh

Ratnajit Saha^{1*}, Nepal C. Dey^{1†}, Sajidur Rahman², Lakshman Galagedara³ and Prosun Bhattacharya⁴

¹BRAC Research and Evaluation Division, BRAC Centre, 75 Mohakhali, Dhaka 1212, Bangladesh

[†]Department of Environmental Science and Disaster Management, Noakhali Science and Technology University, Noakhali, Bangladesh

²Centre for Climate Change and Environmental Research, BRAC University, 49 Mohakhali, Dhaka 1212, Bangladesh

³School of Science and the Environment, Memorial University of Newfoundland-Grenfell Campus, 20 University Drive, Corner Brook, NL, A2H 5G4, Canada

⁴KTH-International Groundwater Arsenic Research Group, Department of Sustainable Development, Environmental Science and Engineering, KTH Royal Institute of Technology, Teknikringen 10B, SE-100 44 Stockholm, Sweden

*Correspondence: saharatnajit@gmail.com

Abstract

Development, monitoring and management of drinking water resources, especially groundwater, are essential for sustainable water extraction. The present study aimed to explore suitable locations and depths for installing tubewells for safe drinking water. Tala *upazila* of Satkhira district, in the coastal area of Bangladesh, was selected as the study area. Groundwater samples were collected from 632 shallow tubewells (STW) and deep tubewells (DTW). *In-situ* measurements were done for seven important water quality parameters (Arsenic-As, Iron-Fe, Electrical Conductivity-EC, Temperature-Temp, Total Coliform-TC, *E.coli* and Fecal Coliform-FC). Weighted arithmetic water quality index (WQI) was used to calculate the suitability of drinking water collected from tubewells. Experimental value based maps for each parameter were prepared and safe aquifer sites were identified using WQI and geo-statistical as well as geo-spatial analysis. Range of As, Fe and EC were found to be 0-500 µg/L, 0-18 mg/L and 165-8715 µS/cm, respectively and for STW, 88%, 99% and 100% and for DTW, 64%, 71% and 100% exceeded WHO drinking water standards. Comparatively high proportion of STW (TC-41%, *E.coli*-24% and FC-49%) contained coliform bacteria than DTW (TC-23%, *E.coli*-15% and FC-28%). Only small proportional areas, such as 24 km² for As, 27 km² for Fe, 113 km² for TC, 132 km² for *E.coli* and 102 km² for FC were found safe in DTW. Multiple patches of safe aquifer were identified at deeper depths in the north-central, central and south-western part of the study area. According to WQI, overall 39 km² area (12% of total area) were explored as a suitable site for installing tubewells where good to excellent quality water could be found in deeper depth aquifer. The findings will help policy makers, practitioners and local communities to find out the suitable locations and depths for installation of tubewells in the study area for extracting safe drinking water.

Download English Version:

<https://daneshyari.com/en/article/8870484>

Download Persian Version:

<https://daneshyari.com/article/8870484>

[Daneshyari.com](https://daneshyari.com)